Ser. No. 09/672,511

Amendments to the claims

.Please amend the claims of the instant application as follows:

1. Canceled.

2. (Currently amended) The encoder of claim ~~1~~ 6 wherein said first coding algorithm and said second coding algorithm differ in at most the corresponding quantization processes included therein.

3. (Currently amended) The encoder of claim ~~1~~ 6 wherein said source signal comprises a speech signal.

4. (Currently amended) The encoder of claim ~~1~~ 6 wherein said second quantized data value as produced by said second quantization process is determined so that said second quantization error resulting from said second quantization process is such that if combined with said first quantization error resulting from said first quantization process to produce a net quantization error, said net quantization error will be less than said first quantization error.

5.   Canceled.

6. (Currently amended) ~~The encoder of claim 5~~ A multi-descriptive encoder for generating a plurality of multi-descriptive bit streams from a single source signal, the encoder comprising:
a source signal input port for supplying the source signal;
a first coder applied to the source signal input port, the first coder for generating a first multi-descriptive bit stream from the source signal, the first coder employing a first coding algorithm which includes a first quantization process in which a first data value based on the source signal is coded with use of a corresponding first quantized data value, thereby resulting in a corresponding first quantization error representative of a difference between said first data value and said first quantized data value; and
a second coder applied to the source signal input port, the second coder for generating a

3

Ser. No. 09/672,511

second multi-descriptive bit stream from the source signal, the second coder employing a second coding algorithm which includes a second quantization process in which a second data value, based on the source signal and corresponding to said first data value, is coded with use of a corresponding second quantized data value, thereby resulting in a corresponding second quantization error representative of a difference between said second data value and said second quantized data value,

wherein said second quantized data value as produced by said second quantization process is based at least in part on said first quantization error resulting from said first quantization process,

wherein said first quantization process and said second quantization process each select said corresponding quantized data values from a single predetermined set of quantization values, and

wherein said first and second quantization processes each comprise a pulse code modulation scheme which selects said corresponding quantized data values from a single predetermined set of scalar quantization values, wherein said first data value based on the source signal and said second data value based on the source signal are equal to a common scalar value representative of a portion of said source signal, wherein said first quantized data value is selected from said set of scalar quantization values as an approximation to said common scalar value, and wherein said second quantized data value is selected as a neighboring value in said set of quantization values to said first quantized data value when said common scalar value is closer to an average of said first quantized data value and said neighboring value than to any value in said set of quantization values.

7. (Currently amended) ~~The encoder of claim 5~~ A multi-descriptive encoder for generating a plurality of multi-descriptive bit streams from a single source signal, the encoder comprising:

a source signal input port for supplying the source signal;

a first coder applied to the source signal input port, the first coder for generating a first multi-descriptive bit stream from the source signal, the first coder employing a first coding algorithm which includes a first quantization process in which a first data value based on the source signal is coded with use of a corresponding first quantized data value, thereby resulting in a corresponding first quantization error representative of a difference between said first data value and said first quantized data value; and

a second coder applied to the source signal input port, the second coder for generating a second multi-descriptive bit stream from the source signal, the second coder employing a second coding algorithm which includes a second quantization process in which a second data value, based

4

Ser. No. 09/672,511

on the source signal and corresponding to said first data value, is coded with use of a corresponding second quantized data value, thereby resulting in a corresponding second quantization error representative of a difference between said second data value and said second quantized data value,

wherein said second quantized data value as produced by said second quantization process is based at least in part on said first quantization error resulting from said first quantization process,

wherein said first quantization process and said second quantization process each select said corresponding quantized data values from a single predetermined set of quantization values, and

wherein said first and second quantization processes each comprise a pulse code modulation scheme which selects said corresponding quantized data values from a single predetermined set of scalar quantization values, wherein said first data value based on the source signal is equal to a scalar value representative of a portion of said source signal and said second data value based on the source signal is equal to said first data value offset by a fixed predetermined amount, and wherein said first quantized data value is selected from said set of scalar quantization values as an approximation to said first data value and said second quantized data value is selected from said set of scalar quantization values as an approximation to said second data value.

8-10. Canceled.

11. (Currently amended) The encoder of claim ~~10~~ 13 wherein said first predetermined amount of time and said second predetermined amount of time are equal.

12. Canceled.

13. (Currently amended) ~~The encoder of claim 12~~ A multi-descriptive encoder for generating a plurality of multi-descriptive bit streams from a single source signal, the encoder comprising:
    a source signal input port for supplying the source signal;
    a first coder applied to the source signal input port, the first coder for generating a first multi-descriptive bit stream from the source signal, the first coder employing a first coding algorithm which includes a first quantization process in which a first data value based on the source signal is coded with use of a corresponding first quantized data value, thereby resulting in a corresponding first quantization error representative of a difference between said first data value and said first

5

Ser. No. 09/672,511

quantized data value; and

a second coder applied to the source signal input port, the second coder for generating a second multi-descriptive bit stream from the source signal, the second coder employing a second coding algorithm which includes a second quantization process in which a second data value, based on the source signal and corresponding to said first data value, is coded with use of a corresponding second quantized data value, thereby resulting in a corresponding second quantization error representative of a difference between said second data value and said second quantized data value,

wherein said second quantized data value as produced by said second quantization process is based at least in part on said first quantization error resulting from said first quantization process,

the encoder further comprising means for modifying said first and second quantization processes in a periodic fashion, such that after a first predetermined amount of time,

(i) said first quantization process produces a subsequent first quantized data value based at least in part on a corresponding subsequent second quantization error resulting from said second quantization process, and

(ii) said second quantization process produces a subsequent second quantized data value not based on a corresponding subsequent first quantization error resulting from said first quantization process; and

after a second predetermined amount of time,

(iii) said second quantization process produces a further subsequent second quantized data value based at least in part on a corresponding further subsequent first quantization error resulting from said first quantization process, and

(iv) said first quantization process produces a further subsequent first quantized data value not based on a corresponding further subsequent second quantization error resulting from said second quantization process,

wherein said first and second predetermined amounts of time are based on quality levels associated with a first communications channel used for transmitting said first multi-descriptive bit stream and a second communications channel used for transmitting said second multi-descriptive bit stream, respectively, and

wherein a ratio of said first predetermined amount of time divided by said second predetermined amount of time is approximately equal to a ratio of an estimated probability of a frame erasure occurring in a transmission across said second communications channel divided by an

6

Ser. No. 09/672,511

estimated probability of a frame erasure occurring in a transmission across said first communications channel.

14-33. Canceled.

34. (Currently amended) The method of claim ~~33~~ 38 wherein said first coding algorithm and said second coding algorithm differ in at most the corresponding quantization processes included therein.

35. (Currently amended) The method of claim ~~33~~ 38 wherein said source signal comprises a speech signal.

36. (Currently amended) The method of claim ~~33~~ 38 wherein said second quantized data value as produced by said second quantization process is determined so that said second quantization error resulting from said second quantization process is such that if combined with said first quantization error resulting from said first quantization process to produce a net quantization error, said net quantization error will be less than said first quantization error.

37. Canceled.

38. (Currently amended) ~~The method of claim 37~~ A method for performing multi-descriptive encoding of a single source signal and for generating a plurality of multi-descriptive bit streams therefrom, the method comprising the steps of:

coding the source signal with a first coder to generate a first multi-descriptive bit stream, the first coder employing a first coding algorithm which includes a first quantization process in which a first data value based on the source signal is coded with use of a corresponding first quantized data value, thereby resulting in a corresponding first quantization error representative of a difference between said first data value and said first quantized data value; and

coding the source signal with a second coder to generate a second multi-descriptive bit stream, the second coder employing a second coding algorithm which includes a second quantization process in which a second data value, based on the source signal and corresponding to said first data value, is coded with use of a corresponding second quantized data value, thereby resulting in a

7

Ser. No. 09/672,511

corresponding second quantization error representative of a difference between said second data value and said second quantized data value,

wherein said second quantized data value as produced by said second quantization process is based at least in part on said first quantization error resulting from said first quantization process,

wherein said first quantization process and said second quantization process each select said corresponding quantized data values from a single predetermined set of quantization values,

wherein said first and second quantization processes each comprise a pulse code modulation scheme which selects said corresponding quantized data values from a single predetermined set of scalar quantization values, and

wherein said first data value based on the source signal and said second data value based on the source signal are equal to a common scalar value representative of a portion of said source signal, wherein said first quantized data value is selected from said set of scalar quantization values as an approximation to said common scalar value, and wherein said second quantized data value is selected as a neighboring value in said set of quantization values to said first quantized data value when said common scalar value is closer to an average of said first quantized data value and said neighboring value than to any value in said set of quantization values.

39. (Currently amended) ~~The method of claim 37~~ A method for performing multi-descriptive encoding of a single source signal and for generating a plurality of multi-descriptive bit streams therefrom, the method comprising the steps of:

coding the source signal with a first coder to generate a first multi-descriptive bit stream, the first coder employing a first coding algorithm which includes a first quantization process in which a first data value based on the source signal is coded with use of a corresponding first quantized data value, thereby resulting in a corresponding first quantization error representative of a difference between said first data value and said first quantized data value; and

coding the source signal with a second coder to generate a second multi-descriptive bit stream, the second coder employing a second coding algorithm which includes a second quantization process in which a second data value, based on the source signal and corresponding to said first data value, is coded with use of a corresponding second quantized data value, thereby resulting in a corresponding second quantization error representative of a difference between said second data value and said second quantized data value,

8

Ser. No. 09/672,511

wherein said second quantized data value as produced by said second quantization process is based at least in part on said first quantization error resulting from said first quantization process,

wherein said first quantization process and said second quantization process each select said corresponding quantized data values from a single predetermined set of quantization values,

wherein said first and second quantization processes each comprise a pulse code modulation scheme which selects said corresponding quantized data values from a single predetermined set of scalar quantization values, and

wherein said first and second quantization processes each comprise a pulse code modulation scheme which selects said corresponding quantized data values from a single predetermined set of scalar quantization values, wherein said first data value based on the source signal is equal to a scalar value representative of a portion of said source signal and said second data value based on the source signal is equal to said first data value offset by a fixed predetermined amount, and wherein said first quantized data value is selected from said set of scalar quantization values as an approximation to said first data value and said second quantized data value is selected from said set of scalar quantization values as an approximation to said second data value.

40-42. Canceled.

43. (Currently amended) The method of claim ~~42~~ 45 wherein said first predetermined amount of time and said second predetermined amount of time are equal.

44. Canceled.

45. (Currently amended) ~~The method of claim 44~~ A method for performing multi-descriptive encoding of a single source signal and for generating a plurality of multi-descriptive bit streams therefrom, the method comprising the steps of:

coding the source signal with a first coder to generate a first multi-descriptive bit stream, the first coder employing a first coding algorithm which includes a first quantization process in which a first data value based on the source signal is coded with use of a corresponding first quantized data value, thereby resulting in a corresponding first quantization error representative of a difference between said first data value and said first quantized data value; and

9

Ser. No. 09/672,511

coding the source signal with a second coder to generate a second multi-descriptive bit stream, the second coder employing a second coding algorithm which includes a second quantization process in which a second data value, based on the source signal and corresponding to said first data value, is coded with use of a corresponding second quantized data value, thereby resulting in a corresponding second quantization error representative of a difference between said second data value and said second quantized data value,

wherein said second quantized data value as produced by said second quantization process is based at least in part on said first quantization error resulting from said first quantization process,

the method further comprising the step of modifying said first and second quantization processes in a periodic fashion, such that after a first predetermined amount of time,

(i) said first quantization process produces a subsequent first quantized data value based at least in part on a corresponding subsequent second quantization error resulting from said second quantization process, and

(ii) said second quantization process produces a subsequent second quantized data value not based on a corresponding subsequent first quantization error resulting from said first quantization process; and

after a second predetermined amount of time,

(iii) said second quantization process produces a further subsequent second quantized data value based at least in part on a corresponding further subsequent first quantization error resulting from said first quantization process, and

(iv) said first quantization process produces a further subsequent first quantized data value not based on a corresponding further subsequent second quantization error resulting from said second quantization process,

wherein said first and second predetermined amounts of time are based on quality levels associated with a first communications channel used for transmitting said first multi-descriptive bit stream and a second communications channel used for transmitting said second multi-descriptive bit stream, respectively, and

wherein a ratio of said first predetermined amount of time divided by said second predetermined amount of time is approximately equal to a ratio of an estimated probability of a frame erasure occurring in a transmission across said second communications channel divided by an estimated probability of a frame erasure occurring in a transmission across said first communications

10

Ser. No. 09/672,511

channel.

46-64. Canceled.

And add the following new claims 65-70:

65. (New) The encoder of claim 7 wherein said first coding algorithm and said second coding algorithm differ in at most the corresponding quantization processes included therein.

66. (New) The encoder of claim 7 wherein said source signal comprises a speech signal.

67. (New) The encoder of claim 7 wherein said second quantized data value as produced by said second quantization process is determined so that said second quantization error resulting from said second quantization process is such that if combined with said first quantization error resulting from said first quantization process to produce a net quantization error, said net quantization error will be less than said first quantization error.

68. (New) The method of claim 39 wherein said first coding algorithm and said second coding algorithm differ in at most the corresponding quantization processes included therein.

69. (New) The method of claim 39 wherein said source signal comprises a speech signal.

70. (New) The method of claim 39 wherein said second quantized data value as produced by said second quantization process is determined so that said second quantization error resulting from said second quantization process is such that if combined with said first quantization error resulting from said first quantization process to produce a net quantization error, said net quantization error will be less than said first quantization error.

11